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Diabetes Self Management Education in an Underserved Primary Care Setting

Jessica Salas
University of San Diego, jessicasalas@sandiego.edu

DIABETES SELF MANAGEMENT EDUCATION IN AN UNDERSERVED PRIMARY CARE SETTING

Authors:

Jessica M. Salas, BSN, RN, DNP Student

University of San Diego

ABSTRACT

Objective: A key component to the management of type 2 diabetes is appropriate self management of the disease by the patient. The purpose of this project was to provide culturally appropriate Diabetes Self Management Education in an underserved primary care setting to improve glycemic control among Spanish speaking patients who have uncontrolled diabetes.

Research Design and Methods: The evidence based practice project took place at a primary care practice in an underserved area. Fifteen Spanish speaking patients with uncontrolled type 2 diabetes with a hemoglobin A1c greater than 7% were included in the intervention. The intervention included implementation of Diabetes Self Management Education during two separate thirty-minute primary care visits with the provider over a three-month period. During the visit the provider utilized evidenced based education tools and a diabetes take home care record for patients. Both Hemoglobin A1c and body mass index data were collected at baseline and at each visit.

Results: Implementation of DSME during the primary care visit over the three-month period resulted in improved glycemic control as seen by improved Hemoglobin A1c values. The mean Hemoglobin A1c decreased from 8.59 with usual care to 7.84 after the intervention. BMI change was not found to be significant to intervention.

Conclusions: Providers can play an integral role on empowering the patient to take control of their diabetes and prevent harmful health complications. Standardized diabetes education in the primary care setting allows for better health outcomes in relation to diabetes management. Implementation of culturally sensitive diabetes self management education in underserved populations is key to provide effective glycemic control.

INTRODUCTION

Problem Description

Diabetes Mellitus is a chronic disease that affects many people worldwide. If not managed appropriately or undiagnosed, diabetes can contribute to co-morbidities and health complications. It is estimated that 29.1 million, or 1 in 11 people, have diabetes in the United States (Centers for Disease Control and Prevention [CDC], 2014). In California there has been an increasing trend in adults with diabetes estimating from 4.2% in 1994 to 9.9% in 2014 (CDC, 2014). There is a continued upward trend seen in diabetes diagnosis among Americans. In San Diego County it is projected that 185,172 or 7.7% of residents have diabetes (CDC, 2014.) The statistics show overwhelming evidence that diabetes is a huge problem today that must not be overlooked. It is essential to manage diabetes appropriately to prevent complications such as neuropathy, retinopathy, renal failure, and cardiovascular disease to name a few.

Available Knowledge

Implementation of diabetic self management education (DSME) during the provider visits is an evidenced based strategy. DSME focuses on multiple lifestyle modifications such as diet, exercise, and blood glucose monitoring (Ricci-Cabello et al.,2014). The lifestyle modifications focused on in this project were diet, exercise, and promotion of medication adherence. There are many acceptable diets that can be used with patients who are diabetic, the overall recommendation is healthy eating patterns with appropriate portion control (American Diabetes Association, 2017). Some dietary examples include high fiber foods, low glycemic foods, and carbohydrate intake from whole grains, fruits and vegetables (American Diabetes Association, 2017). Dietary changes were reviewed with patients at each visit and written materials were used to aid the teaching. Physical activity recommendations were also reviewed

with the patients during each visit. The current recommendation states patients with diabetes should engage in 150 minutes per week of moderate physical activity (American Diabetes Association, 2017). Focus on these lifestyle modifications was of upmost importance during the visit with the provider and was included in the diabetes take home record as well.

The diabetes take home record is an evidenced based tool used for patients to follow their diabetes management. This tool was provided to patients to take home at the initial visit then brought back and reviewed at the follow up visit. After implementation of the take home diabetes record more than half of patients had a decrease of greater than 0.9 in hemoglobin A1c (Chapin, Williams, & Adair, 2003). The take home record is a tool that allows for improved communication between the patient and provider during the visit while allowing the patient to see their trends in hemoglobin A1c and self management behaviors at home. The record serves as a beneficial visual tool allowing patients to set a specific target and the necessary actions needed to accomplish the goal according to the randomized control trial by Chapin, Williams, and Adair, 2003.

The evidence demonstrates that DSME is effective for glycemic control in patients with diabetes. In this project setting it is important to consider the specific population being in an underserved area and who are mostly of Hispanic/Latino origin. According to Ferguson et al. (2015) 45.8% of Hispanic adults with diabetes had never attended a DSME class in comparison to White non Hispanic adults with diabetes. In an underserved are we must bear in mind barriers that may hinder ability to attend additional appointments or classes. Many patients in this practice are non adherent to follow up with dieticians or endocrinology and only attend their primary care appointments for diabetes care. A systematic review found that in Hispanic adults with type 2 diabetes diabetes self management education in combination with primary care

resulted in enhanced glycemic control (Ferguson et al., 2015). Another level three study showed improved hemoglobin A1c values in 89% of participants receiving DSME with synchronous provider visits (Gold et al., 2008). In a recent quality improvement study (level five evidence) provider delivered DSME showed reduction of hemoglobin A1c from baseline to follow up at three months (Seol et al., 2016). In this project the evidenced based strategy of DSME in conjunction with primary care provider visit was utilized.

Evidence for the Problem

The project took place in a private practice in North San Diego County which provides primary care to an underserved population in which more then half of the patients are Hispanic/Latino. Those who are of ethnic minority groups are more prone to be diagnosed with diabetes; 12.8% of Hispanics age 20 and older are diagnosed with diabetes (CDC, 2014). In the clinic about 42% of patients have diabetes and only 12% have a hemoglobin A1c less than 7%. According to Ferguson, Swan, and Smaldone (2015) Hispanics in the United States are said to have a hemoglobin A1c that is 0.5% higher compared to whites of non Hispanic origin. A key component to living with diabetes includes appropriate self management behaviors. Self management refers to an individual being able to manage the disease such as with medical treatments but also includes lifestyle modifications associated with diabetes (Ricci-Cabello et al., 2014). The patients in the clinic have a lack of understanding of diabetes monitoring and of self management activities. Many patients do not understand their glycemic values such as Hemoglobin A1c or the lifestyle modifications associated with their diagnosis. Those who are ethnic minorities tend to not participate in diabetic self management behaviors which is associated with health literacy, health beliefs, and/or non-culturally sensitive information (Ricci-Cabello et al., 2014). Due to minorities being more likely to have diabetes and not take part in

self management behaviors, it is necessary to provide culturally appropriate care that is sensitive to their needs in order to effectively manage the disease and prevent negative health outcomes.

Framework and Purpose

The Iowa Model of Evidenced Based Practice (EBP) is a well established model that has been utilized in various settings to implement research into practice and therefore improving health outcomes. The purpose of the Iowa Model is to guide clinicians in identification of a problem or "trigger" thus utilizing EBP to guide a practice change and improve quality of care (Melnyk & Fineout-Overholt, 2015). A key component to this model is that in order for change to be successful the matter has to be of significance to the particular setting. Uncontrolled diabetes as evidenced by increased hemoglobin A1c values is a current problem among the patients seen in this clinic. The literature shows that diabetes self management education is a key aspect to glycemic control. Therefore, the setting is ready to pilot the practice change according to the Iowa model. The purpose of this project was to provide culturally appropriate Diabetes Self Management Education in an underserved primary care setting to improve glycemic control among Spanish speaking patients who have uncontrolled diabetes.

METHODS

A factor that contributes to the uncontrolled diabetes among the patients in this setting is that it is an underserved population with specific health needs. Barriers in minority or underserved populations include low socioeconomic level, cultural or language barrier, and health literacy (Seol, Thompson, Kreider, & Vorderstrasse, 2016). These aspects contribute to decreased understanding of the disease, hemoglobin A1c values, and self management activities at home. These factors also contribute to non compliance factors with referrals to specialty such as endocrinology. Since there is not a standardized education practice in place other then verbal

communication during the visit with the provider, the patient does not have a guide at home to enforce self management behaviors therefore creating a lack of knowledge. As most patients speak Spanish it is important to provide teaching materials in Spanish and at the appropriate reading level in order to allow for a culturally appropriate process.

Project Description

The evidenced-based practice project focused on implementation of diabetes self management education intervention during the visits with primary care provider over three months. The standard practice in this setting for patients with Type 2 Diabetes includes routine visits for diabetes management every 3 months with the clinic MD. The primary care provider in this project was the DNP student. All the patients included had an initial hemoglobin A1c value above 7%. There were 15 patients involved in the project who met the criteria of having type 2 diabetes and had a hemoglobin A1c greater than 7%. The patients were all of Latino decent and Spanish is their primary language. All 15 patients in this project had been diagnosed with diabetes for many years and were on oral medication agents alone or taking a combination of oral agents and insulin.

The first visit with the DNP student was thirty minutes long and Hemoglobin A1c values were collected within the week prior to the visit. BMI was collected at the time of the visit. The education provided during the visit with the provider utilized education handouts from the American Diabetes Association as teaching tools and were provided to the patient to take home. Topics included diet therapy, sample walking program, and learning about Hemoglobin A1c values. A diabetes take home record was provided to the patient at the initial visit and reviewed with the provider at the follow up visit. This record included Hemoglobin A1c values at each visit and goal Hemoglobin A1c. Handouts from Krames (Kramesstore.com) were also provided to each patient to take home which reviewed self management education in detail.

The medical assistants provided a follow up call to remind the patient of their appointment and to bring their diabetes take home record to the follow up visit. The patients had hemoglobin A1c values drawn by the lab or clinic staff prior to the follow up visit. The follow up visit took place three-months after the initial visit. At this visit the DNP student reviewed self management behaviors with the patients. The diabetes care record was also reviewed. Discussion of hemoglobin A1c and BMI values was also done. This was also a 30-minute visit with each patient.

Measures

Monitoring and review of patients' hemoglobin A1c and Body Mass Index (BMI) are evidenced based activities done at each visit. Hemoglobin A1c is shown to be an effective indicator of glucose control and is therefore utilized to measure glycemic control that provides forecast to vascular complications in diabetes (Chrvala, Sherr, & Lipman, 2015). Although BMI is not a primary indicator of glycemic control it is an important secondary outcome that is associated with improved outcomes according to a systematic review by Ricci-Cabello et al., 2014. This article was also a systematic review making it level one evidence (Melnyk & Fineout-Overholt, 2015). Weight management plays an important role in diabetes. It is recommended that overweight individuals with diabetes initially achieve greater then 5% weight loss and ideally maintain greater than 7% weight (American Diabetes Association, 2017). This recommendation by the American Diabetes Association is reported as a standard of medical care. Hemoglobin A1c was the primary value used to trend glycemic control during this project and BMI was utilized as a secondary outcome measure.

Data Collection and Analysis

The demographic data collected for each patient in this project included: age, gender, ethnicity. There were 5 males and 10 females in the project group with an age range from 38 to

82 years of age. Three Hemoglobin A1c values were collected for each patient. The Pre-Hemoglobin A1c collected was collected from the patients' medical record which was the 3 months prior to the initial visit when they were receiving diabetes care as usual by the MD. The second value was collected within the week of the initial visit with DNP student. The third Hemoglobin A1c value was collected 3 months after the initial visit within the week of the follow up visit with the DNP student. Hemoglobin A1c is the primary indicator of glycemic control because it is effective at predicting vascular complications in diabetes (Chrvala, Sherr, & Lipman, 2015). The goal will be for patients to have a hemoglobin A1c less than 7%. The American Diabetes Association (2017) suggest a hemoglobin a1c less then 7% as effective glycemic control. The BMI was also collected with each Hemoglobin A1c value. Date of each visit was also collected. All data was collected by the DNP student using Excel Spreadsheets. Using Excel, the data was analyzed to retrieve mean hemoglobin A1c values for all patients. Change in patients' behavior was also analyzed by comparing baseline data and post intervention Hemoglobin A1c to results the average change in behavior over the project time.

RESULTS

At the start of this project there were 15 patients and at the end there were a total of 11 patients as 4 patients were lost to follow up. These patients were unable to be contacted due to being out of the country or had a disconnected phone line. The range of hemoglobin A1c among the 15 patients prior to the intervention was 7.2 to 10.6%. The mean Hemoglobin A1c prior to the intervention was 9.0% among these patients. After implementation of DSME the mean Hemoglobin A1c among these patients decreased to 7.8%. This shows that there was improved glycemic control in these patients after the intervention. When comparing these results to the usual care the patients were receiving prior to the DSME intervention the average Hemoglobin

A1c among this group of patients increased from 8.59% to 9.07%. This demonstrates that continuing care as usual will thus lead to and continued rise in Hemoglobin A1c and therefore uncontrolled diabetes and lack of glycemic control. This can be seen in Figure 1 below.

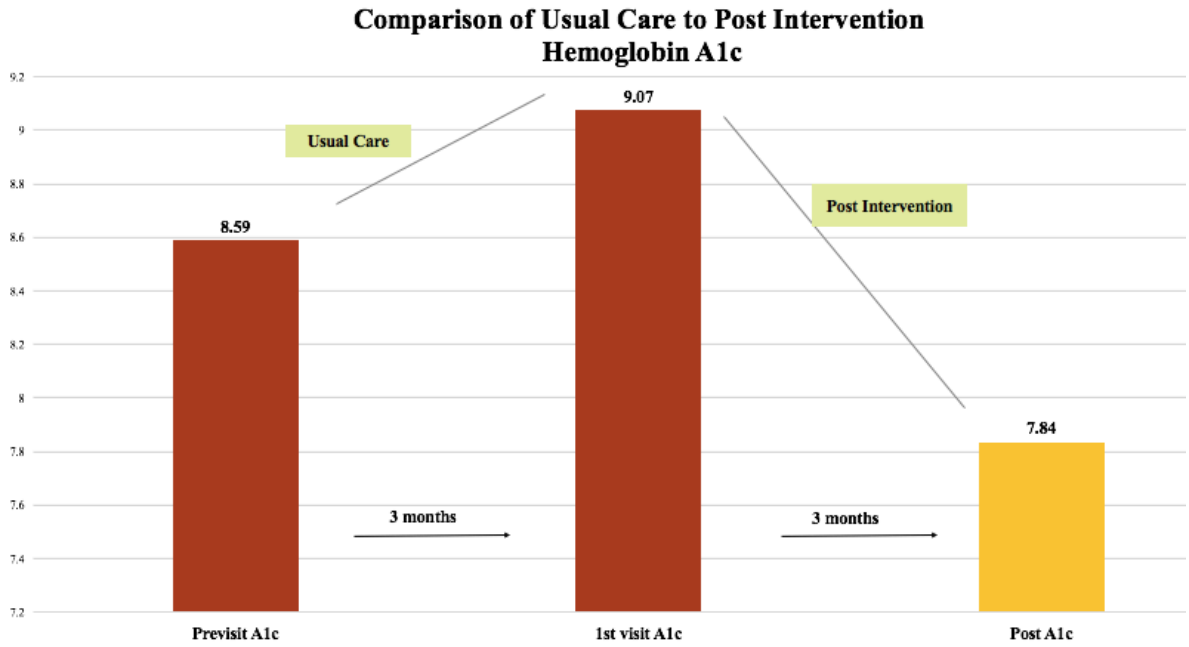

Figure 1. Comparison of average Hemoglobin A1c values during usual care, initial visit with DNP student, and follow up visit with DNP after DSME intervention

When looking at the mean Hemoglobin A1c trends among these patients over a six-month period it was identified that with usual care the values worsened by -4.7. When comparing usual care to the post DSME intervention in these patients over the six-month period Hemoglobin A1c values improved by 1.10. This positive value shows a reduction in Hemoglobin A1c values and consequently improved glycemic control. This can be seen in Figure 2.

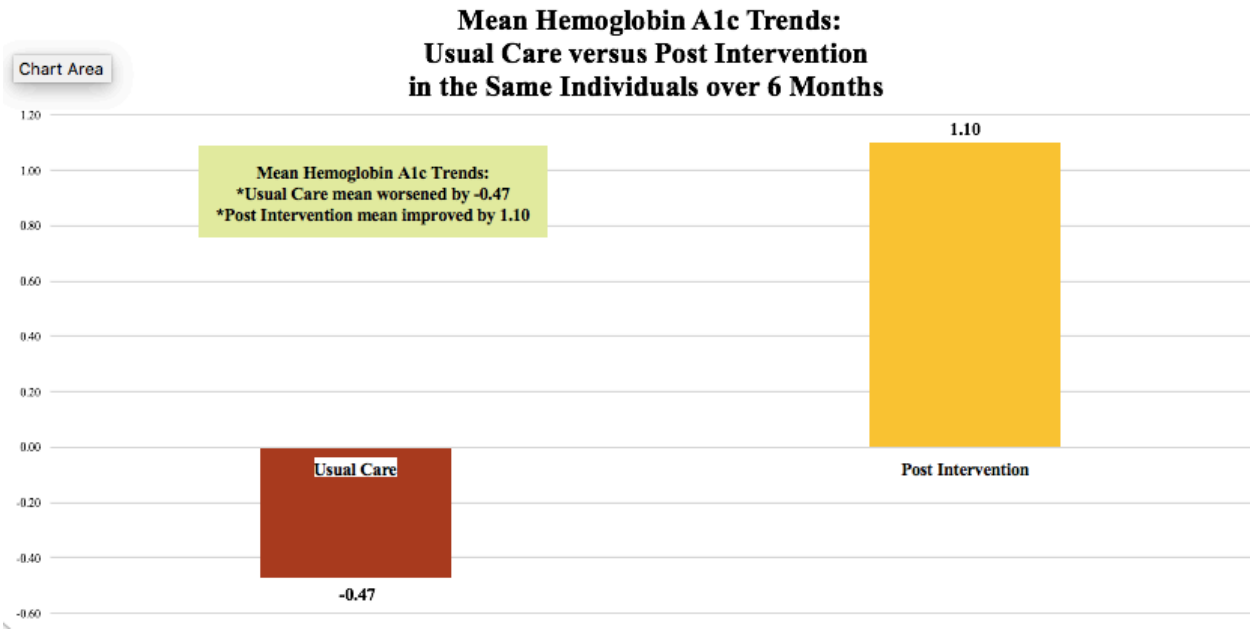

Figure 2. Mean Hemoglobin A1c trend post DSME intervention by DNP student to usual care prior to intervention

Change in BMI was not found to be significant in this project. In the 11 remaining patients that completed the intervention and follow up visit, 2 had an unchanged BMI, 5 improved, and 4 worsened. BMI was not shown to be significant in this short time period of three months. More time would be necessary to determine significant weight loss and BMI improvement.

DISCUSSION

Implementation of DSME during the primary care visit by the provider in this underserved clinical setting among Latino patients resulted in improved glycemic control. Hemoglobin A1c values improved after the intervention by the DNP student. In the 11 patients who completed the intervention and follow up all but one had a decrease in their Hemoglobin A1c after the 3-month period after DSME intervention. Use of the diabetes care record was influential to patients because they were able to understand what the Hemoglobin A1c meant and

the goal of less than 7%. Most of the patients were unable to verbalize what a Hemoglobin A1c was or its importance in relation to their diabetes. Patients were able to learn and understand what the significance of Hemoglobin A1c and its relationship to their glycemic control. Education on medication adherence, diet changes, and exercise was also influential on the improvement of glycemic control. Patients were taught how to appropriately take their medication regimen, daily walking exercise, and what foods to eat as well as portion control. These are all key factors to diabetes self management and effective glycemic control.

The results of this project are consistent with that of other studies that implemented diabetes self management in conjunction with primary care effectively improving diabetic control as previously discussed. The project was relatively easy to implement and did not change the routine of the primary care provider. Diabetes education can be provided within the 30-minute visit with the provider every 3 months. Patients were overall eager to take control and learn how to better manage their diabetes. Patients expressed an understanding of the topics and were comfortable to ask questions to the DNP student when a concept was unclear. Patients verbalized that they felt comfortable learning from the DNP student because the education was given in Spanish, their primary language, without needing an interpreter.

Cost/Benefit Analysis

Overall costs to implement DSME were low. The education materials and diabetes record provided to patients cost about four dollars per patient. When comparing this to the complications of uncontrolled diabetes and a hospitalization cost, this is a minor cost. It is estimated that a hospital admission with diagnosis of diabetes mellitus with complications costs $9,000 per stay (Pfuntner, Weir, & Steiner, 2013). Therefore, if glycemic control is achieved in

15 patients receiving DSME, 15 hospital admissions can be prevented, which is a $135,00 savings.

Limitations

There are limitations to this project. The small sample size of 15 patients and short project time of 3 months. Although there was improved glycemic control it would be important to evaluate continue glycemic progress over a longer period of time with continued follow up with the primary care provider. It is because of the short project time that BMI was not found to be significant and weight loss would need to be evaluated over longer project period. Another limitation is that of follow up. In this project four patients were lost to follow up, and some of the remaining patients required multiple phone calls by the medical assistant to schedule the follow up appointment while some also required rescheduling of the visit a few times. This can become an issue for clinic productivity and patients may consequently become lost to follow up. A possible confounding factor in this project could be that the DNP student is also Latino and Spanish speaking therefore influencing the patients' comfort and ability to relate to the provider where as in other settings with a provider of a different culture results could be affected.

Conclusions

Diabetes is a complex chronic disease that requires specific management to reach glycemic control and prevent associated health complications. Implementation of culturally sensitive education in this underserved population setting is anticipated to help improve glycemic control. DSME focusing on lifestyle modifications such as diet and exercise have been shown to better diabetic outcomes. By focusing education on management of the disease and lifestyle improvements providers can play a big role on empowering patient to take control of their diabetes and prevent harmful health complications. Primary care providers are at the forefront of

healthcare and chronic disease management such as diabetes. Standardized diabetes education in the primary care setting allows for better health outcomes in relation to diabetes management.

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